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Re:

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Docket No.: 050195-0417 PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

In re Application of	:	Customer Number: 20277
Makoto IWASHIMA, et al.	:	Confirmation Number: 8884
Serial No.: 10/779,613	:	Group Art Unit: 2834
Filed: February 18, 2004	:	Examiner: Erik D. Preston

For: POWER CONVERTER AND RELATED METHOD

TRANSMITTAL OF APPEAL BRIEF

Mail Stop Appeal Brief
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

CERTIFICATE OF TRANSMISSION (UNDER 37 CFR 1.8(a)(1))

I hereby certify that on August 23, 2006, this document and all listed attachments are being transmitted via facsimile to (571) 272.9797, Attn: Board of Patent Appeals and Interference, known to me to be the USPTO Patent Appeals Central FAX Number. At Palo Alto, California.

PATRICIA A. BALBO

Submitted herewith is Appellant's Appeal Brief in support of the Notice of Appeal filed June 28, 2006. Please charge the Appeal Brief fee of $500.00 Deposit Account 500417.

To the extent necessary, a petition for an extension of time under 37 C.F.R. 1.136 is hereby made. Please charge any shortage in fees due under 37 C.F.R. 1.17 and 41.20, and in connection with the filing of this paper, including extension of time fees, to Deposit Account 500417 and please credit any excess fees to such deposit account.

Respectfully submitted,

McDERMOTT WILL & EMERY LLP

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Please recognize our Customer No. 20277 as our correspondence address.

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APPEAL BRIEF

Mail Stop Appeal Brief
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

This Appeal Brief is submitted in support of the Notice of Appeal, filed June 28, 2006, wherein Appellants appeal from the Primary Examiner's rejection of claims 1-20.

I. Real Party In Interest

This application is assigned to Nissan Motor Co., LTD by assignment recorded on February 18, 2004, at Reel 015001, Frame 0189.

II. Related Appeals and Interferences

There are no related appeals or interferences.

III. Status of Claims

Claims 1 through 20 are pending and stand rejected as stated in the final Office Action (hereinafter "the Office Action") dated February 24, 2006.

IV. Status of Amendments

An Amendment was filed under 37 C.F.R § 1.116 on May 24, 2006, subsequent to the February 24, 2006 Final Office Action. The Examiner issued an Advisory Action on June 16, 2006. According to the Advisory Action, the Amendment pursuant to 37 C.F.R. §1.116 will be entered if an Appeal is taken. Since an Appeal has been taken, Appellants are proceeding on the basis that the Amendment submitted pursuant to 37 C.F.R. §1.116 has been entered, that the objection to claim 10 has been with withdrawn.

V. Summary of Claimed Subject Matter

Independent Claim 1

Claim 1 describes a power converter arranged in series with a motor to form a unitary structure through which an output shaft extends, and includes a plurality of coolers. Each of the coolers extends along a radial direction with respect to an output shaft so as to be perpendicular to the output shaft, and has a cooling surface defined by a direction parallel to the output shaft and the radial direction. A power semiconductor module is mounted on the cooling surface of at least one of the plurality of coolers. Exemplary implementations of a power converter as described in claim 1 are illustrated in Figs. 3A and 17. A power converter 1 is arranged in series with a motor to form a unitary structure through which an output shaft 4 extends, and includes a plurality of coolers 11-16. Each of the coolers extends along a radial direction with respect to the output shaft 4 so as to be perpendicular to the output shaft 4,

and has a cooling surface defined by a direction parallel to the output shaft 4 and the radial direction with respect to the output shaft 4. A power semiconductor module (71A-71D; 72A-72D; 73A-73D) is mounted on the cooling surface of at least one of the plurality of coolers. With the claimed structure, an exemplary power converter is able to reduce its size and improve cooling performance because the cooling device is divided into a plurality of coolers that extend along a radial direction from the output shaft with the power semiconductor modules.

Independent Claim 18

Claim 18 describes a method for cooling for cooling a power converter. A plurality of coolers are provided. Each of the coolers extends along a radial direction with respect to an output shaft of a motor formed in series with the converter so as to be perpendicular to the output shaft. Similar to the converter of claim 1, the method of claim 18 provides a cooling surface defined by a direction parallel to the output shaft and the radial direction, and a power semiconductor module is mounted on the cooling surface of at least one of the coolers.

VI. Grounds of Rejection To Be Reviewed By Appeal

1. Claims 1-8 and 18-20 stand finally rejected under 35 U.S.C. §102(e) as being anticipated by Takahashi et al. (U.S. Publication No. 2004/0183385);
2. Claims 1-10 and 18-20 stand finally rejected under 35 U.S.C. §102(b) as being anticipated Gründl et al. (DE 10112799);
3. Claims 11 and 14-17 stand finally rejected under 35 U.S.C. §103(a) as being unpatentable over Ishiyama (US Patent No. 5,632,351) in view of Gründl;

4. Claim 12 stands finally rejected under 35 U.S.C. §103(a) as being unpatentable over Ishiyama in view of Gründl and Kim et al. (U.S. Publication No. 2001/0054730); and

5. Claim 13 was rejected under 35 U.S.C. §103(a) as being unpatentable over Gründl in view of Jackson et al. (U.S. Patent No. 2,942,165).

VII. Argument

For the convenience of the Honorable Board of Patent Appeals and Interferences (the "Board"), Appellants only separately argue the patentability of independent claim 1 and dependent claim 11. Accordingly: claims 2-10 and 18-20 stand or fall with independent claim 1, and claims 12-17 stand or fall with claim 11.

Claims separately argued

Claims 1 and 11.

Groupings of claims argued:

1. Claim 1, 2 through 10 and 18 through 20; and
2. Claim 11 and 12 through 17.

A. The rejection of claims 1-8 and 18-20 under 35 U.S.C. §102(e) over Takahashi

Appellants submit that anticipation rejection is overcome because Takahashi is not an effective reference under §102(e). As Appellants indicated in the May 24, 2006 Response, this application properly claims priority under 35 U.S.C. § 119 from Japanese patent application No. JP2003-082873, filed March 25, 2003. A certified copy of the Japanese application was made of record, and an English

translation of the priority document and an accompanying statement indicating that the translation is accurate were attached to the May 24, 2006 Response to perfect the priority claim.

On the other hand, Takahashi, the applied document, was filed in the U.S. on August 19, 2003, later than the priority date of this application, and thus does not qualify as an effective reference under 35 U.S.C. §102(e). Therefore, Takahashi cannot support a prima facie case of anticipation. The anticipation rejection of claims 1-8 and 18-20 based on Takahashi is not legally viable. Reversal of the anticipation rejection of claims 1-8 and 18-20 is respectfully solicited.

B. The rejection of claims 1-10 and 18-20 under 35 U.S.C. §102(b) over Gründl

Initially, Appellants note that claims 2-10 and 18-20 stand or fall with independent claim 1.

The factual determination of lack of novelty under 35 U.S.C. § 102 requires the identical disclosure in a single reference of each element of a claimed invention, such that the identically claimed invention is placed into the recognized possession of one having ordinary skill in the art. *Dayco Prods., Inc. v. Total Containment, Inc.*, 329 F.3d 1358, 66 USPQ2d 1801 (Fed. Cir. 2003); *Crown Operations International Ltd. v. Solutia Inc.*, 289 F.3d 1367, 62 USPQ2d 1917 (Fed. Cir. 2002). In imposing a rejection under 35 U.S.C. § 102, the Examiner is required to specifically identify wherein an applied reference is perceived to identically disclose each and every feature of a claimed invention. *In re Rijckaert*, 9 F.3d 1531, 28 USPQ2d 1955 (Fed. Cir. 1993); *Lindemann Maschinenfabrik GMBH v. American Hoist & Derrick Co.*, 730 F.2d 1452, 221 USPQ 481 (Fed. Cir. 1984). It is submitted that the burden imposed on the examiner by 35 U.S.C. § 102 as summarized in the above-identified precedents has not been discharged.

Claim 1 is an independent claim and is reproduced as follows:

> A power converter arranged in series with a motor to form a unitary structure through which an output shaft extends, comprising:
> a plurality of coolers each of which extends along a radial direction with respect to an output shaft so as to be perpendicular to the output shaft and having a cooling surface defined by a direction parallel to the output shaft and the radial direction; and
> a power semiconductor module mounted on the cooling surface of at least one of the plurality of coolers to supply electric power to a motor.

Exemplary implementations of a power converter as described in claim 1 are illustrated in Figs. 3A and 17. A power converter 1 is arranged in series with a motor to form a unitary structure through which an output shaft 4 extends, and includes a plurality of coolers 11-16. Each of the coolers extends along a radial direction with respect to the output shaft 4 so as to be perpendicular to the output shaft 4, and has a cooling surface defined by a direction parallel to the output shaft 4 and the radial direction with respect to the output shaft 4. A power semiconductor module (71A-71D; 72A-72D; 73A-73D) is mounted on the cooling surface of at least one of the plurality of coolers. With the structure described in claim 1, an exemplary power converter is able to reduce its size and improve cooling performance because the cooling device is divided into a plurality of coolers that extend along a radial direction from the output shaft with the power semiconductor modules.

The Office Action relies heavily upon Fig. 1 and related descriptions in Gründl for meeting the claimed requirements. However, Gründl's construction and structure are **different** from the claimed power converter and do not meet the claimed limitations. As described in claim 1, cooling surfaces of coolers are defined by (1) a direction parallel to the output shaft **and** (2) a radial direction perpendicular to the output shaft, and a power semiconductor module a power semiconductor module is mounted on the cooling surface of at least one of the plurality of coolers. For instance, as illustrated in Fig. 3A of this application, power semiconductor modules 71A-71D, 72A-72D and 73A-73D are located on cooler surfaces of coolers 11-16.

In **contrast**, as shown in Fig. 1 of Gründl, Gründl's power semiconductor module 46 is mounted on a cooling surface defined by (1) a direction parallel to the output shaft **and** (2) a circumferential direction, **not** a cooling surface defined by (1) a direction parallel to the output shaft **and** (2) a radial direction perpendicular to the output shaft, as described in claim 1. Accordingly, Gründl fails to disclose that each of the coolers extends along a radial direction with respect to an output shaft so as to be perpendicular to the output shaft, and has a cooling surface defined by a direction parallel to the output shaft and the radial direction; and that a power semiconductor module is mounted on the cooling surface of at least one of the plurality of coolers, as described in claim 1.

In rejecting claim 1, the Examiner **erroneously** alleged that Gründl discloses a comparable cooling surface by disclosing a surface defined by a direction "extends axially" and a "**thickness**" of cooler 40 "defined by the radial direction." According to this construction, an alleged surface is parallel to bar 40a. However, as clear shown in Fig. 1 of Gründl, no power semiconductor module is mounted on such an alleged surface, which is contrary to the claim descriptions.

Since Gründl fails to disclose every limitation of claim 1, Gründl cannot support a prima facie case of anticipation, and hence the anticipation rejection based on Gründl is untenable. Reversal of the anticipation rejection of claims 1-8 and 18-20 is respectfully solicited.

C. The rejection of claims 11 and 14-17 under 35 U.S.C. §103(a) over Ishiyama and Gründl

Initially, Appellants note that claims 14-17 stand or fall with claim 11.

Legal precedent is well developed on the subject of obviousness in the application of a rejection under 35 U.S.C. §103. It is incumbent upon the examiner to factually support a conclusion of obviousness. *In re Mayne,* 104 F.3d 1339, 41 USPQ2d 1451 (Fed. Cir. 1997*); In re Oetiker*, 977 F.2d

1443, 24 USPQ2d 1443 (Fed. Cir. 1992). The examiner must provide a reason why one having ordinary skill in the art would have been led to modify a particular prior art reference in a particular manner to arrive at a particular claimed invention; *Ecolochem Inc. v. Southern California Edison, Co.* 227 F.3d 361, 56 USPQ2d 1065 (Fed. Cir. 2000); *In re Rouffet*, 149 F.3d 1350, 47 USPQ2d 1453 (Fed. Cir. 1998). *Ashland Oil, Inc. v. Delta Resins & Refractories, Inc.*, 776 F.2d 281, 227 USPQ 657 (Fed. Cir. 1985); *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988); *Stratoflex, Inc. v. Aeroquip Corp.*, 713 F.2d 1530, 218 USPQ 871 (Fed. Cir. 1983); *In re Warner*, 379 F.2d 1011, 154 USPQ 173 (CCPA 1967).

In order to establish the requisite motivation, "clear and particular" factual findings must be made as to a specific understanding or specific technological principle which would have realistically compelled one having ordinary skill in the art to modify a particular reference to arrive at the claimed invention, based upon facts, not generalizations. *Ruiz v. A.B. Chance Co.*, 234 F.3d 654, 57 UPSQ2d 1161 (Fed. Cir. 2000); *Ecolochem Inc. v. Southern California Edison, Co.* 227 F.3d 361, 56 USPQ2d 1065 (Fed. Cir. 2000); *In re Kotzab*, 217 F.3d 1365, 55 USPQ 1313 (Fed. Cir. 2000); *In re Dembiczak*, 175 F.3d 994, 50 USPQ2d 1614 (Fed. Cir. 1999). Whether the prior art may be capable of modification, and what may or may not be known in general, are not determinative per se to establish the requisite realistic motivation for obviousness; see *In re Deuel*, 51 F.3d 1552, 34 USPQ2d 1210 (Fed. Cir. 1995). The question is not what one having ordinary skill in the art could or could not do, but, rather, why would one having ordinary skill in the art have been realistically impelled by the prior art teachings to deviate from the prior art process described in the background of the present application to arrive at the claimed invention. *Gentry Gallery v. Berkline*, 134 F.3d 1473, 45 USPQ2d 1498 (Fed. Cir. 1998); *In re Fritch*, 972 F.2d 1260, 23 USPQ2d 1780 (Fed. Cir. 1992). Reliance upon a problem with the prior art that is only recognized and disclosed by the present application for a basis of motivation

under 35 U.S.C. § 103 is no more than inappropriate hindsight reconstruction using appellant's disclosed invention as a guide. *In re Warner*, 379 F.2d 1011, 154 USPQ 173 (CCPA 1967).

It is respectfully submitted that the record has not met the established criteria for a determination of obviousness under 35 U.S.C. § 103.

Claim 11 depends on claim 1 and incorporates every limitation thereof, and further describes that a capacitor is disposed between respective ones of the plurality of coolers adapted to smooth a DC voltage.

As discussed earlier relative to claim 1, Gründl fails to meet every feature described in claim 1. The other cited document, Ishiyama, also fails to alleviate the deficiencies of Gründl.

Ishiyama's power converter includes a single piece of power sink 20 for dissipating heat generated by semiconductor devices 21, 23 mounted on the surface of the power sink 20. The single power sink 20 encloses a plurality of cooling fins 47. Each of the cooling fins 47 is disposed parallel to an output shaft 13. As shown in Fig. 8, **each** of the cooling fins 47 extends in a direction substantially tangential to the shaft 13, **not** along a radial direction relative to shaft 13, as described in claim 1. Furthermore, each cooling fins 47 only has a cooling surface substantially parallel to the shaft 13. The cooling surface of each cooling fans 47 is not defined by both a direction **parallel to the output shaft** and the **radial** direction, as described in claim 1. Moreover, according to Ishiyama, the semiconductor devices 21, 23 are mounted to the heat sink 20 enclosing all the cooling fins 47. None of the semiconductor devices 21, 23 actually attaches to the cooling surface of any of the cooling fins 47. Thus, the semiconductor devices 21, 23 of Ishiyama do not meet the limitation of claim 1, which requires that the semiconductor devices be mounted to a cooling surface of at least one of the coolers. Accordingly, similar to Gründl, Ishiyama also fails to disclose "a plurality of coolers each of which extends along a radial direction with respect to an output shaft so as to be perpendicular to the output

shaft and having a cooling surface defined by a direction parallel to the output shaft and the radial direction; and a power semiconductor module mounted on the cooling surface of at least one of the plurality of coolers to supply electric power to a motor," as required by claim 1. Thus, Ishiyama, even if combined with Gründl, does not meet every limitation of claim 1, the features of which are incorporated into claim 11 by virtue of its dependency. Accordingly, the obviousness rejection of claim 1 based on the combination of Gründl and Ishiyama is not viable. Reversal of the obviousness rejection of claims 11 and 14-17 is respectfully solicited.

D. The rejection of claim 12 under 35 U.S.C. §103(a) over Ishiyama in view of Gründl and Kim

Appellants do not separately argue the patentability of claim 12. Claim 12 stands or falls with claim 11.

E. The rejection of claim 13 under 35 U.S.C. §103(a) over Gründl in view of Jackson

Appellants do not separately argue the patentability of claim 13. Claim 13 stands or falls with claim 11.

Conclusion

Based upon the foregoing, Appellants submit that the Examiner's rejections under 35 U.S.C. §102(b), 102(e) and 103(a) are untenable, and that the grounds of rejections of the claims on appeal are in error and should be reversed.

CLAIMS APPENDIX

1. A power converter arranged in series with a motor to form a unitary structure through which an output shaft extends, comprising:

a plurality of coolers each of which extends along a radial direction with respect to an output shaft so as to be perpendicular to the output shaft and having a cooling surface defined by a direction parallel to the output shaft and the radial direction; and

a power semiconductor module mounted on the cooling surface of at least one of the plurality of coolers to supply electric power to a motor.

2. The power converter according to claim 1, wherein the output shaft includes at least one of a motor shaft and a drive shaft connected to the motor shaft.

3. The power converter according to claim 1, wherein each of the plurality of coolers includes a plurality of cooling surfaces, and each of is defined by the direction parallel to the output shaft and the radial direction.

4. The power converter according to claim 1, wherein each of the plurality of coolers includes a set of coolers opposing to one another, and each of the set of coolers extends along the radial direction.

5. The power converter according to claim 1, wherein each of the plurality of coolers is mounted on a cylindrical structural member surrounding the output shaft.

6. The power converter according to claim 1, wherein each of the plurality of coolers is mounted on a structural member located at an end face of a motor.

7. The power converter according to claim 1, wherein each of the plurality of coolers includes a plurality of coolant passageways that extend in parallel to the output shaft.

8. The power converter according to claim 1, wherein each of the plurality of coolers includes a plurality of coolant passageways that extend along the radial direction.

9. The power converter according to claim 1, wherein an end portion of each of the plurality of coolers is connected to at least one of a delivery conduit communicating with coolant passages of the other of the plurality of coolers and a coolant delivery conduit communicating with a power converter.

10. The power converter according to claim 1, wherein an end portion of each of the plurality of coolers is connected to an annular coolant passage connected to a coolant delivery conduit connected to a power converter.

11. The power converter according to claim 1, further comprising a capacitor disposed between respective ones of the plurality of coolers adapted to smooth a DC voltage.

12. The power converter according to claim 11, wherein the capacitor has a cross sectional shape formed in a fan-shape or a trapezoid.

13. The power converter according to claim 1, wherein each of the plurality of coolers has a pair of cooling surfaces, on each of which the power semiconductor module is mounted, and terminals of the power semiconductor module mounted on one of the pair of cooling surfaces has a symmetric relationship with those on the other of the cooling surfaces with respect to corresponding one of the plurality of coolers.

14. The power converter according to claim 1, further comprising a current sensor disposed in a corner section projecting from a cross sectional circular shape of a power converter and detecting output currents of the power semiconductor module.

15. The power converter according to claim 1, further comprising an AC output terminal disposed in a corner section projecting from a cross sectional circular shape of a power converter and connecting a power converter and a motor.

16. The power converter according to claim 15, wherein the AC output terminal is three-phase AC output terminal and have three output terminals, and each of the three output terminals is disposed in corresponding one of three corner sections projecting from the cross sectional circular shape of the power converter.

17. The power converter according to claim 1, further comprising a DC power input terminal disposed in a corner section, projecting from a cross sectional circular shape of a power converter, in which no other component elements are located.

18. A method of cooling a power converter formed in series with a motor in a unitary structure through which an output shaft extends, the method comprising:

providing a plurality of coolers, each of the coolers extending along a radial direction with respect to an output shaft so as to be perpendicular to the output shaft, and having a cooling surface defined by a direction parallel to the output shaft and the radial direction; and

mounting a power semiconductor module on the cooling surface of at least one of the plurality of coolers to supply electric power to a motor.

19. The power converter according to claim 1, wherein the plurality of coolers are arranged along corresponding radial directions, each of which is perpendicular to the output shaft, at circumferentially spaced intervals therebetween.

20. The method according to claim 18, wherein the plurality of coolers are arranged along corresponding radial directions, each of which is perpendicular to the output shaft, at circumferentially spaced intervals therebetween.

EVIDENCE APPENDIX

Not Applicable

Not Yet Assigned 10/779,613

RELATED PROCEEDINGS APPENDIX

Not Applicable